We claim:

1. An ultra-thin flexible expanded graphite heating element, produced by a method comprising the steps of:
   (a) providing a flexible expanded graphite sheet having a surface adhered to a substrate;
   (b) pulling apart the sheet and the substrate with a force sufficient to separate the adhered flexible expanded graphite sheet into a removed layer and a remainder layer adhered to the substrate; and
   (c) optionally repeating steps (a) and (b) until the remainder layer has a thickness of about 0.01 mils to about 2 mils.

2. The heating element of claim 1, wherein the thickness of the remainder layer is substantially uniform.

3. The heating element of claim 1, wherein the thickness of the remainder layer is non-uniform.

4. The heating element of claim 1, wherein the substrate is electrically insulating.

5. An ultra-thin flexible expanded graphite heating element, produced by a method comprising the steps of:
   (a) providing a flexible expanded graphite sheet having a top surface, and a bottom surface adhered to a first substrate;
   (b) adhering a second substrate to the top surface; and
   (c) separating the first and second substrates with a force sufficient to separate the flexible expanded graphite sheet into a first remainder layer adhered to the first substrate and a second remainder layer adhered to the second substrate; and
   (d) optionally repeating steps (a), (b) and (c) until at least one of the remainder layers has a thickness of about 0.01 mils to about 2 mils.

6. The heating element of claim 5, wherein the thicknesses of the remainder layers are independent and are substantially uniform.

7. The heating element of claim 5, wherein the thicknesses of the remainder layers are independent and non-uniform.

8. The heating element of claim 5, wherein at least one of the substrates is electrically insulating.

9. An ultra-thin flexible expanded graphite heating element having a non-uniform thickness, produced by a method comprising the steps of:

   (a) providing a flexible expanded graphite sheet having a top surface, and a bottom surface adhered to a first substrate;

   (b) non-uniformly adhering a second substrate to the top surface; and

   (c) separating the first and second substrates with a force sufficient to separate the flexible expanded graphite sheet into a first remainder layer adhered to the first substrate and a second remainder layer adhered to the second substrate; and

   (d) optionally repeating steps (a), (b) and (c) until at least a portion of one of the remainder layers has thickness of about 0.01 mils to about 2 mils.

10. The heating element of claim 9, wherein the thicknesses of the remainder layers are independently non-uniform.

11. The heating element of claim 9, wherein at least one of the substrates is electrically insulating.

12. An ultra-thin flexible expanded graphite sheet having a thickness of about 0.01 mils to about 2 mils.

13. The sheet of claim 12, wherein the thickness is about 0.01 mils to about 1.5 mils.

14. The sheet of claim 12, wherein the thickness is about 0.01 mils to about 1 mils.

15. The sheet of claim 12, wherein the thickness is about 0.01 mils to about 0.4 mils.

16. The sheet of claim 12, wherein the thickness is about 0.01 mils to about 0.1 mils.

17. A resistance heater for high voltage applications, comprising:

(a) an electrically insulating substrate;

(b) a flexible expanded graphite sheet having a thickness of about 0.01 mils to about 2 mils;

(c) a power source; and

(d) a connector for supplying power from the power source to the flexible expanded graphite sheet.

18. A method for making an ultra-thin flexible expanded graphite heating element, comprising the steps of:

(a) providing a flexible expanded graphite sheet having a surface adhered to a substrate;

(b) pulling apart the sheet and the substrate with a force sufficient to separate the adhered flexible expanded graphite sheet into a removed layer and a remainder layer adhered to the substrate; and

(c) optionally repeating steps (a) and (b) until the remainder layer has a thickness of about 0.01 mils to about 2 mils.

19. The method of claim 13, wherein the thickness of the remainder layer is substantially uniform.

20. The method of claim 13, wherein the thickness of the remainder layer is non-uniform.

21. The method of claim 13, wherein the substrate is electrically insulating.

22. A method for making an ultra-thin flexible expanded graphite heating element, comprising the steps of:

(a) providing a flexible expanded graphite sheet having a top surface, and a bottom surface adhered to a first substrate;

(b) adhering a second substrate to the top surface; and

(c) separating the first and second substrates with a force sufficient to separate the flexible expanded graphite sheet into a first remainder layer adhered to the first substrate and a second remainder layer adhered to the second substrate; and

(d) optionally repeating steps (a), (b) and (c) until at least one of the remainder layers has a thickness of about 0.01 mils to about 2 mils.

23. The method of claim 17, wherein the thicknesses of the remainder layers are independent and are substantially uniform.

24. The method of claim 17, wherein the thicknesses of the remainder layers are independent and non-uniform.

25. The method of claim 17, wherein at least one of the substrates is electrically insulating.

26. A method for making an ultra-thin flexible expanded graphite heating element having a non-uniform thickness, comprising the steps of:

(a) providing a flexible expanded graphite sheet having a top surface, and a bottom surface adhered to a first substrate;

(b) non-uniformly adhering a second substrate to the top surface; and

(c) separating the first and second substrates with a force sufficient to separate the flexible expanded graphite sheet into a first remainder layer adhered to the first substrate and a second remainder layer adhered to the second substrate; and

(d) optionally repeating steps (a), (b) and (c) until at least a portion of one of the remainder layers has thickness of about 0.01 mils to about 2 mils.

27. The method of claim 21, wherein the thicknesses of the remainder layers are independently non-uniform.

28. The method of claim 21, wherein at least one of the substrates is electrically insulating.